

LIVING WITH EMERALD ASH BORER: ASH REDUCTION MODELS AS SILVICULTURAL TOOLS

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ABSTRACT

The exotic emerald ash borer (*Agrilus planipennis*) (Coleoptera: Buprestidae) is established in a number of states, including Michigan, Indiana, and Ohio, and in one Canadian province, Ontario. At high population densities, all green, black, and white ash trees are apparently susceptible to attack and can be expected to die. Emerald ash borer larvae develop in the phloem of ash trees in stems and branches above approximately 2.5 cm in diameter. Removal of ash from high priority areas such as those stands in close proximity to outlier populations will reduce the population density of this insect.

The surface area of over 500 ash trees was measured using standing trees as well as cut trees throughout Lower and Upper Michigan. White, green, and black ash trees in open-grown and forested settings were all represented. There are strong quadratic relationships between diameter at breast height and calculated surface area of the tree, but these quadratic relationships differ significantly between open-grown and forest-grown trees when the different ash species are considered. Multiple models have been developed for use in management prescriptions to reduce the amount of ash available to emerald ash borer. These models are based on ash species and crown light exposure. Information on ash species and the light exposure for most

of the trees in a stand (i.e., forested or open-grown trees) may allow managers to use a more specific model to fit their stand.

Other relationships between diameter, surface area, and volume of phloem are being determined. These relationships, in addition to others involving tree vigor, form, and growing conditions, have been integrated into models characterizing the amount of ash phloem in a forest stand. Using these models with density information (trees per acre) from a stand and stock table, we can determine diameter limits for cutting to meet prescribed ash phloem reduction targets. By reducing emerald ash borer populations through phloem reduction, and decreasing the removal of the smaller trees in a stand, this model will enable the genetic diversity of ash to be optimized during ash reduction efforts. Similar models are available for use when the management goal is to retain large trees within a stand. Applied models help land managers to make scientifically quantifiable decisions relating to ash reduction in forests. Forest resource managers are able to access the models online at www.ashmodel.org and determine the diameter limit for removal of ash to achieve the phloem reduction target within the context of other forest management goals.